CLAIMS

Claim 1. A diagnostic method for quantifying a subject suffering from a symptom caused by traumatic brain injury or characteristic of traumatic brain injury, comprising:

a. obtaining a sample of body fluid from a subject;

b. selecting at least one marker appropriate to the condition of said subject suffering from a symptom caused by TBI or characteristic of TBI;

c. measuring concentration of said at least one marker in said sample; and

d.. if required, further monitoring said subject as in preceding steps (a), (b), and (c), respectively, until said subject can be fully diagnosed.

Claim 2. A method as in claim 1, wherein said sample of body fluid is serum or plasma.

Claim 3. A method as in claim 1, wherein said at least one marker is selected from the group consisting of S-100B, neuron specific enolase, and myelin basic protein.

Claim 4. A method as in claim 1, wherein said at least one marker is S-100B.

Claim 5. A method as in claim 1, wherein said at least one marker is neuron specific enolase.

Claim 6. A method as in claim 1, wherein said at least once marker is myelin basic protein.

Claim 7. A method as in claim 1, wherein said at least one marker is selected from the group consisting of glial, neuronal, and axonal markers.

Claim 8. A method as in claim 1, wherein said measuring concentration is by an immunoassay method.

Claim 9. A method as defined in claim 1, wherein each of said analyses is carried out on the same sample of body fluid.

Claim 10. A method as defined in claim 1, wherein at least one of said analyses is carried out on a first sample of body fluid and at least another of said analyses is carried out on a second sample of body fluid.

Claim 11. A method as defined in claim 10, wherein said first and said second samples of body fluid are taken at different time periods.

Claim 12. A method as in claim 1, further including the step of:

tracking concentration of said at least one marker in said subject over a period of time.

Claim 13. A method as in claim 12, wherein tracking concentration of said at least one marker is performed by a diagnostic procedure selected from the group consisting of radioimmunoassay and enzyme-linked immunoassay method.

Claim 14. A method as in claim 13, wherein each of said immunoassay method comprises contacting said sample of body fluid with an antibody which is specific for said at least one marker.

Claim 15. A diagnostic kit for quantifying traumatic brain injury comprising at least three antibodies which are specific for each of three different marker proteins, said antibodies capable of being immobilized on a solid support, wherein:

a. a first marker protein is the beta isoform of S-100 protein and a first antibody is specific therefor,

b. a second marker protein is neuron specific enolase and a second antibody is specific therefor,

c. a third marker protein is myelin basic protein and a third antibody is specific therefor, and

at least three labeled antibodies, each of said labeled antibodies having an affinity for one of said marker proteins.

Claim 16. A diagnostic kit as defined in claim 15, wherein each of said three antibodies is immobilized on the same solid support.

Claim 17. A diagnostic kit as defined in claim 15, wherein each of said three antibodies is immobilized on a separate solid support.

Claim 18. A diagnostic kit as defined in claim 15, wherein at least one of said labeled antibodies comprises an enzyme-labeled antibody.

Claim 19. A diagnostic kit as defined in claim 15 and further including a fourth antibody which is specific for a fourth marker protein, wherein said fourth marker protein is a

glial, axonal or neuronal cell type having a higher molecular weight than the beta isoform of S-100 or neuronal-specific enolase, respectively, and a fourth labeled antibody which binds to said fourth marker protein.

Claim 20. A diagnostic kit as defined in claim 15, wherein said fourth labeled antibody comprises an enzyme-labeled antibody.

Claim 21. A method for confirming the occurrence of a traumatic brain injury event comprising:

a. analyzing a body fluid of a patient to detect the presence and concentration of at least one of three markers of traumatic brain injury wherein;

i. a first marker is myelin basic protein,

ii. a second marker is the beta isoform of S100 protein, and

iii. a third marker is neuronal specific enolase, and

b. comparing any of said markers whose presence is detected to specific threshold values of each of the markers to determine the presence of statistically significant concentrations thereof of at least about two standard deviations above normal levels;

wherein said step of comparing at least one of said three markers confirms the occurrence of a traumatic brain injury

event.

Claim 22. A method as defined in claim 21 wherein said body fluid is selected from the group consisting of blood, blood components and cerebrospinal fluid.

Claim 23. A method as defined in claim 21 wherein each of said analyses is carried out on a single sample of body fluid.

Claim 24. A method as defined in claim 21 wherein at least one of said analyses is carried out on a first sample of body fluid and at least another of said analyses is carried out on a second sample of body fluid.

Claim 25. A method as defined in claim 24 wherein said first and said second samples of body fluid are taken at different time periods.

Claim 26. A method as defined in claim 21 wherein at least one of said analyses comprises contacting said body fluid with an antibody which is specific for said marker.

Claim 27. A method as defined in claim 26 wherein at least one of said analyses is carried out with an enzyme-labeled

immunoassay method.

Claim 28. A method as defined in claim 21 and further including the step of analyzing said body fluid for a fourth marker protein, wherein said fourth marker protein is cell type specific with respect to one of said first, second or third markers and has a correspondingly higher molecular weight than said first, second or third marker.

Claim 29. A method as defined in claim 28 wherein at least one of said analyses
comprises contacting said body fluid with an antibody which is specific for said marker.

Claim 30. A method as defined in claim 28 wherein at least one of said analyses is carried out with an enzyme-labeled immunoassay method.

Claim 31. A method as defined in claim 21 and further including the step of analyzing a second sample of a body fluid from said patient for at least one of said three markers, said second sample of body fluid being taken at a time subsequent to the time at which said body fluid analyzed in step a is taken.

Claim 32. A diagnostic kit for confirming the occurrence of a traumatic brain injury event comprising at least three antibodies which are specific for each of three different marker proteins, said antibodies capable of being immobilized on a solid support, wherein

a. a first marker protein is myelin basic protein and a first antibody is specific therefor,

b. a second marker protein is the beta isoform of S100 protein and a second antibody is specific therefor, and

c. a third marker protein is neuronal specific enolase and a third antibody is specific therefor, and

at least three labeled antibodies, each of said labeled antibodies binding to one of said marker proteins, and

e. means for comparing said three markers to specific threshold values of each of the markers to determine the presence of statistically significant concentrations thereof of at least about two standard deviations above normal levels;

wherein said step of comparing said three markers confirms the occurrence of a traumatic brain injury event.

Claim 33. A diagnostic kit as defined in claim 32 wherein each of said three antibodies are immobilized on the same solid support.

Claim 34. A diagnostic kit as defined in claim 32 wherein at least one of said three antibodies is immobilized on a first solid support and at least another of said three antibodies is immobilized on a second solid support.

Claim 35. A diagnostic kit as defined in claim 32 wherein at least one of said labeled antibodies comprises an enzyme-labeled antibody.

Claim 36. A diagnostic kit as defined in claim 32 and further including a fourth antibody which is specific for a fourth marker protein, wherein said fourth marker protein is cell type specific with respect to one of said first, second or third markers and has a correspondingly higher molecular weight than said first, second or third marker, and a fourth labeled antibody which binds to said fourth marker protein.

Claim 37. A diagnostic kit as defined in claim 36 wherein said fourth labeled antibody comprises an enzyme-labeled antibody.